

**Response of  
Wisconsin Power and Light Company  
to  
The Public Service Commission of Wisconsin  
Data Request No. 1.12**

Docket Number: 05-CE-137  
Date of Request: January 29, 2009  
Information Requested By: Ken Detmer  
Date Responded: February 17, 2009  
Author: Eric Guelker  
Author's Title: Mgr Environmental Services  
Author's Telephone No.: (608) 458-8163  
Witness: (If other than Author)

---

**Data Request No. 1.12:**

p. 25 Table 4: Provide electronic copy of the table.

**Response:**

WPL has provided an electronic copy of Table 4 (05-CE-137 Data Request No. 01.12 Attachment A). WPL has also provided an electronic spreadsheet (05-CE-137 Data Request No. 01.12 Attachment B) performing the analysis summarized in Table 4.

Please note that the correct value in Table 4 under the column identified as "Compliance Margin" for Scenario 2 in year 2012 should be 39.4% (not 39.2% as shown in Table 4). The correct value appears in the spreadsheet in which the analysis summarized in Table 4 is performed.

*Table 4. NOx Emissions and RACT Compliance Summary at the Edgewater Generating Station<sup>a</sup>*

Scenario 1: Current and Approved Operation					
Controls Installed		SNCR/RRI	SNCR/RRI	SOFA	Compliance Margin
Year	Estimated Facility Limit (lb/MMBtu)	Edgewater Unit 3 (lb/MMBtu)	Edgewater Unit 4 (lb/MMBtu)	Edgewater Unit 5 (lb/MMBtu)	
2009	0.155	0.20	0.11	0.16	7.5%
2010	0.155	0.20	0.11	0.16	7.5%
2011	0.155	0.20	0.11	0.16	7.5%
2012	0.155	0.20	0.11	0.16	7.5%
2013	0.105	0.20	0.11	0.16	-36.6%
2014+	0.105	0.20	0.11	0.16	-36.6%
Scenario 2: SCR Installed on Edgewater Unit 5 (As Proposed in this CA Application)					
Controls Installed		SNCR/RRI	SNCR/RRI	SOFA and SCR (2012)	Compliance Margin
Year	Estimated Facility Limit (lb/MMBtu)	Edgewater Unit 3 (lb/MMBtu)	Edgewater Unit 4 (lb/MMBtu)	Edgewater Unit 5 (lb/MMBtu)	
2009	0.155	0.20	0.11	0.16	7.5%
2010	0.155	0.20	0.11	0.16	7.5%
2011	0.155	0.20	0.11	0.16	7.5%
2012	0.155	0.20	0.11	0.06	39.2%
2013	0.105	0.20	0.11	0.06	10.5%
2014+	0.105	0.20	0.11	0.06	10.5%
Scenario 3: SCR Installed on Edgewater Unit 4					
Controls Installed		SNCR/RRI	SNCR/RRI and SCR (2013)	SOFA	Compliance Margin
Year	Estimated Facility Limit (lb/MMBtu)	Edgewater Unit 3 (lb/MMBtu)	Edgewater Unit 4 (lb/MMBtu)	Edgewater Unit 5 (lb/MMBtu)	
2009	0.155	0.20	0.11	0.16	7.5%
2010	0.155	0.20	0.11	0.16	7.5%
2011	0.155	0.20	0.11	0.16	7.5%
2012	0.155	0.20	0.11	0.16	7.5%
2013	0.105	0.20	0.06	0.16	-16.8%
2014+	0.105	0.20	0.06	0.16	-16.8%

- a. Edgewater Unit 5 NOx emissions presented are from the entire unit, both WEPCO's and WPL's shares. Although WEPCO plans to separate its share of Edgewater Unit 5 NOx emissions from WPL's share of emissions for their RACT averaging plan for 2009, this is an annual decision and may change in future years such that WPL may have to account for all NOx emissions for Edgewater 5. For example, Scenario 2 would have a compliance margin in Phase II of 5.9% should WEPCO's share of Edgewater Unit 5 not be included.

## Edgewater Generating Station: Proposed RACT Emission Calculations

## Historical Heat Input from CEMS (mmbtu) (color denotes annual or ozone season high used in determining NOx mass cap)

Unit HI	2000		2001		2002		2003		2004		2005		2006		2007		Run Scenarios for Plant Wide Averaging Emission Rate (using historical heat input)																
	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual (Year)	1	2	3	4	5	6	7	8	9	10	11						
U3	4896973	2222323	5243325	2204973	5078054	2092513	4663134	1919551	5132991	1925805	5153793	1883170	4636325	2295861	4380571	1825647	2003	0.000	0.000	0.143	0.000	0.000	0.0000	0.1435	0.0000	0.0000	0.0000	0.0000					
U4 (total)	19360650	7603145	20057104	7162031	19569776	8962355	22168266	9872688	19997435	9918213	21657580	8621530	22640099	9601238	21136131	8092965	2004	0.000	0.000	0.145	0.000	0.000	0.0000	0.1450	0.0000	0.0000	0.0000	0.0000					
U5 (total)	28219323	12595064	28215938	12311534	28381445	12978100	29030707	12547308	27793590	12378777	22078967	8770112	22457573	12511672	27151057	9603407	2005	0.000	0.000	0.142	0.000	0.000	0.0000	0.1421	0.0000	0.0000	0.0000	0.0000					
U5 (WPL)	21164491.9	9446298	21161953	9233651	21286084	9733575	21773030	9410481	20845192	9284083	16559225	6577584	16843179	9383754	20363293	7202555	2006	0.000	0.000	0.141	0.000	0.000	0.0000	0.1410	0.0000	0.0000	0.0000	0.0000					
<b>Formula for Plant Wide Averaging NOx Emission Rate (Equation 7)</b>																																	
(to be used for determining compliance with the annual and ozone season NOx limit beginning May 1, 2009)																																	
U3 NO <sub>x</sub> Mass + U4 NO <sub>x</sub> Mass + U5 NO <sub>x</sub> Mass																																	
ER <sub>aggr</sub> =	U3 NO <sub>x</sub> HI + U4 NO <sub>x</sub> HI + U5 NO <sub>x</sub> HI																																

**Formula for Plant Wide Averaging NOx Emission Limit (Equation 8)**

(to be used for developing the annual and ozone season NOx limit)

(U3 NO<sub>x</sub> Limit\*U3 HI) + (U4 NO<sub>x</sub> Limit\*U4 HI) + (U5 NO<sub>x</sub> Limit\*U5 HI)

EL<sub>aggr</sub> = U3 NO<sub>x</sub> HI + U4 NO<sub>x</sub> HI + U5 NO<sub>x</sub> HI

**Formula for Plant Wide Averaging NOx Mass Cap (Equation 5; required starting Jan 1, 2013)**

(to be used for developing the annual and ozone season NOx cap)

MC = (U3 Year 2013 NOx Limit\*U3 Ave HI) + (U4 Year 2013 NOx Limit\*U4 Ave HI) + (U5 Year 2013 NOx Limit\*U5 Ave HI)

**Proposed RACT Rule NOx Emission Limits (lb/mmbtu)**

(these are individual unit limits that are also used in developing the annual and ozone season NOx averaging plan limit)

Unit	May 1, 2009	May 1, 2013
U3	0.20	0.15
U4	0.15	0.10
U5	0.15	0.10

**Unit NOx Emission Rates Used in Scenario Runs (lb/mmbtu)**

Unit	PHASE I					PHASE II					10	11
	Achievable Continuous Operation	3	4	5	6	7	8	9	10	11		
U3	0.200				0.200							
U4	0.110				0.110							
U5	0.160				0.160							

**SCENARIO 1**

Phase I RACT Compliance Summary					
U3 Rate	U4 Rate	U5 Rate	Est. Average	Est. Limit	Margin %
Achievable Continuous Operation	0.200	0.110	0.160	0.143	0.155 7.5%

Phase II RACT Compliance Summary					
U3 Rate	U4 Rate	U5 Rate	Est. Average	Est. Limit	Margin %
Achievable Continuous Operation	0.200	0.110	0.160	0.143	0.105 -36.6%

Phase I RACT Compliance Summary					
U3 Rate	U4 Rate	U5 Rate	Est. Average	Est. Limit	Margin %
Achievable Continuous Operation	0.200	0.110	0.160	0.141	0.155 9.1%

Phase II RACT Compliance Summary					
U3 Rate	U4 Rate	U5 Rate	Est. Average	Est. Limit	Margin %
Achievable Continuous Operation	0.200	0.110	0.160	0.141	0.105 -34.4%

## Edgewater Generating Station: Proposed RACT Emission Calculations

Run Scenarios for Plant Wide Averaging Emission Rate (using historical heat input)											
Annual (Year)	1	2	3	4	5	6	7	8	9	10	11




<tbl\_r cells="12" ix="4" maxcspan="1"

## Edgewater Generating Station: Proposed RACT Emission Calculations

## Historical Heat Input from CEMS (mmbtu) (color denotes annual or ozone season high used in determining NOx mass cap)

Unit HI	2000		2001		2002		2003		2004		2005		2006		2007		Run Scenarios for Plant Wide Averaging Emission Rate (using historical heat input)															
	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual	Ozone Season	Annual (Year)	1	2	3	4	5	6	7	8	9	10	11													
U3	4896973	2222323	5243325	2204973	5078054	2092513	4663134	1919551	5132991	1925805	5153793	1883170	4636325	2295861	4380571	1825647	2003	0.000	0.000	0.143	0.000	0.000	0.0000	0.0915	0.0000	0.0000	0.0000	0.0000	0.0000			
U4 (total)	19360650	7603145	20057104	7162031	19569776	8962355	2216826	9872688	19997435	9918213	21657580	8621530	22640099	9601238	21136131	8092965	2004	0.000	0.000	0.145	0.000	0.000	0.0000	0.0925	0.0000	0.0000	0.0000	0.0000	0.0000			
U5 (total)	28219323	12595064	28215938	12311534	28381445	12978100	29030707	12547308	27793590	12378777	22078967	8770112	22457573	12511672	27151057	9603407	2005	0.000	0.000	0.142	0.000	0.000	0.0000	0.0969	0.0000	0.0000	0.0000	0.0000	0.0000			
U5 (WPL)	21164491.9	9446298	21161953	9233651	21286084	9733575	21773030	9410481	20845192	9284083	16559225	6577584	16843179	9383754	20363293	7202555	2006	0.000	0.000	0.141	0.000	0.000	0.0000	0.0958	0.0000	0.0000	0.0000	0.0000	0.0000			
<b>Formula for Plant Wide Averaging NOx Emission Rate (Equation 7)</b>											High Annual 3-yr Ave											Run Scenarios for Plant Wide Averaging Emission Rate (using historical heat input)										
(to be used for determining compliance with the annual and ozone season NOx limit beginning May 1, 2009)											CACP model HI											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
ER <sub>aggr</sub> = $\frac{U3 \text{ NO}_x \text{ Mass} + U4 \text{ NO}_x \text{ Mass} + U5 \text{ NO}_x \text{ Mass}}{U3 \text{ NO}_x \text{ HI} + U4 \text{ NO}_x \text{ HI} + U5 \text{ NO}_x \text{ HI}}$											U5 28543825											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
U3 28543825											U4 21294323											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
U4 21294323											U3 5176703											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
U3 5176703											5229560											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
U3 5229560											This is for Annual Average Limit compliance											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
This is for Annual Average Limit compliance											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											Annual (Year)											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											May 1, 2009 May 1, 2013											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											2003 0.154 0.104											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											2004 0.155 0.105											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											2005 0.155 0.105											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											2006 0.155 0.105											Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)										
Run Scenarios for Plant Wide Averaging Emission Limit (using historical heat input)											2007 0.154 0.104											Run Scenarios for Plant Wide Averaging										



**Table 1 - Emission Controls for Edgewater Units (100% of all units included)**

Year	Compliance Limit	Scenario 1				Scenario 2				Scenario 3			
		E3	E4	E5	Compliance Margin	E3	E4	E5	Compliance Margin	E3	E4	E5	Compliance Margin
2009	0.155	0.2	0.11	0.16	7.5%	0.2	0.11	0.16	7.5%	0.2	0.11	0.16	7.5%
2010	0.155	0.2	0.11	0.16	7.5%	0.2	0.11	0.16	7.5%	0.2	0.11	0.16	7.5%
2011	0.155	0.2	0.11	0.16	7.5%	0.2	0.11	0.16	7.5%	0.2	0.11	0.16	7.5%
2012	0.155	0.2	0.11	0.16	7.5%	0.2	0.11	0.06	39.4%	0.2	0.11	0.16	7.5%
2013	0.105	0.2	0.11	0.16	-36.6%	0.2	0.11	0.06	10.5%	0.2	0.06	0.16	-16.8%
2014+	0.105	0.2	0.11	0.16	-36.6%	0.2	0.11	0.06	10.5%	0.2	0.06	0.16	-16.8%
<b>Controls Installed</b>		SNCR/RRI SNCR/RRI SOFA				SOFA SNCR/RRI SNCR/RRI and SCR				SNCR/RRI SNCR/RRI and SCR SOFA			